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EXAMINER	
SONG, HOON K	

ART UNIT	PAPER NUMBER
2882	

DATE MAILED: 04/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/451,965	SENZIG ET AL.	
	Examiner	Art Unit	
	Hoon Song	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 November 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-41* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-31 and 34-41* is/are rejected.

7)☒ Claim(s) *32 and 33* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 December 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 37-40 are rejected under 35 U.S.C. 102(e) as being anticipated by Freeman et al. (US 5960054).

Regarding claim 37, Freeman teaches a method of generating an image of an object using a multimode imaging system configured to operate in a plurality of modes of operation, said method comprising the steps of:

generating an image of the object in a first mode of operation (CT mode, column 4 line 2-4);

generating an image of the object in a second mode of operation (angiography mode, column 4 line 48-50); and

configuring the multimode imaging system to combine at least one image from the first mode of operation with at least one image from the second mode of operation to thereby improve image quality (column 8 line 20-32).

Regarding claim 38, Freeman teaches the plurality of modes of operation comprise a plurality of modes selected from the group consisting of computed

tomographic modes and X-ray fluoro mode (figure 1, column 3 line 19-24).

Regarding claim 39, Freeman teaches at least one of the modes of operation includes an x-ray fluoro mode and another includes a 3-D image mode, and further comprising operating the imaging system in the 3-D image mode to locate a desired element and then operating the imaging system in the x-ray fluoro mode to predict or determine the trajectory of a medical instrument (landmark, column 7 line 65) with respect to the desired element.

Regarding claim 40, Freeman teaches an imaging system for generating an image of an object, said imaging system comprising

a base (CT gantry base figure 2),

a mechanical positioning means (source and detector moving means) movably attached to said base (column 3 line 64),

an x-ray source (B) assembly comprising an x-ray source configured to emit x-ray signals and attached to said mechanical positioning means (column 3 line 64), and

a detector assembly (14) comprising a detector attached to said mechanical positioning means, said system configurable by an operator to combine at least the first image and the second image from the selected modes of operation to thereby improve image quality (column 8 line 20-32).

Claim 41 is rejected under 35 U.S.C. 102(e) as being anticipated by Fujita et al. (US 5748696).

Regarding claim 41, Fujita teaches a method of generating an image of an object using a multimode imaging system (tomography mode and fluoroscopic mode) configured to operate in a plurality of modes of operation, said method comprising

operating the imaging system in a 3-D image mode to locate a desired element (step A1, column 14 line 62-64) and

then operating the imaging system in an x-ray fluoro mode to predict or determine the trajectory of a medical instrument (nyxis needle, column 15 line 4) with respect to the desired element (step 4, column 15, line 1-4).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-12, 15-29 and 34-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe (US 6113264) in view of Freeman et al. (US 5960054).

Regarding claims 1 and 36, Watanabe teaches a method of generating an image of an object using a multimode imaging system configured to operate in a plurality of modes of operation including at least three modes (radiographic mode, CT mode and stationary mode), the multimode imaging system including a source assembly (6), a detector assembly (8), and a mechanical means (2) for positioning the source assembly (6) and the detector assembly (8), the source assembly (6) attached to the mechanical means (2) for positioning and including an x-ray source (6) configured to emit x-ray

signals, the detector assembly (8) attached to the mechanical means (2) for positioning and including a detector, said method comprising the steps of:

selecting a first mode of operation comprising a computed tomography volume mode (CT mode, column 8 line 40-41);

positioning the source assembly and the detector assembly in a first position using the mechanical positioning means (2) for the first mode of operation, wherein the source assembly (6) and the detector assembly (8) are attached to the mechanical positioning means (2) and rotating the mechanical means for positioning while emitting x-rays from the x-ray source and collecting signals from the detector assembly in the first mode of operation (column 9 line 1-24);

selecting a second mode of operation (column 7 line 56-57);

positioning the source assembly (6) and the detector assembly (8) for the second mode (radioscopic mode) of operation in a second position different from the first position (column 7 line 56-57) using the mechanical positioning means (2), wherein the source assembly (6) and the detector assembly (8) are attached to the mechanical positioning means (2) (figure 3);

generating an image of the object for each determined mode of operation, wherein, for the first mode of operation, said generating an image includes using said collected signals from the detector assembly in the first mode of operation (column 7 line 56-57 and column 8 line 40); and

however Watanabe fails to teach a method of rotating the source and detector assembly about an angle of 180 degrees plus a fan angle nor configuring the multimode

imaging system to combine at least one image from the first mode of operation with at least one image from the second mode of operation to thereby improve image quality.

A method of rotating a source and detector about an angle of 180 degrees plus a fan angle is known in CT art.

It would have been obvious to one of ordinary skill in the art at the time of the invention to adapt the method of rotating the source and detector around 180 degrees plus a fan angle, since the rotating method would provide sufficient data collection for reconstructing tomographic image of a patient while reduce x-ray dosage for the patient's safety.

Freeman teaches a method of configuring the multimode imaging system to combine at least one image from the first mode of operation (CT mode) with at least one image from the second mode of operation (angiography mode) to thereby improve image quality.

It would have been obvious to one of ordinary skill in the art at the time of the invention to adapt the multi-mode method of Watanabe with the method of image combination between two imaging mode as taught by Freeman, since the method would provide more accurate images for locating patient's internal organs.

Regarding claim 2, Watanabe teaches that said selecting a second mode of operation, comprises the step of electing at least one of an x-ray fluoro mode (digital radioscopic mode, column 7 line 57-58)

Regarding claim 3, Watanabe teaches that positioning the source assembly (6) and the detector assembly (8), said method comprises the step of rotating the detector assembly and the source assembly about the object (figure 3).

Regarding claim 4, Watanabe teaches an imaging system for generating an image of an object, said imaging system configured to operate in a plurality of modes (digital radioscopic mode and CT mode) of operation including at least three modes and comprising:

a source assembly (6) comprising a movable x-ray source configured to emit x-ray signals (figure 3);

a detector assembly (8) comprising a movable detector (figure 3);

a mechanical positioning means (2) for positioning said source assembly (6) and said detector assembly (8) relative to the object, said source assembly (6) movably attached to said mechanical positioning means and said detector assembly movably attached to said mechanical positioning means (figure 3); and

a controller enabling an operator to selectively operate said system in a plurality of modes comprising a computed tomography volume mode (column 8 line 38) and generate an image of the object for each determined mode of operation, wherein in said computed tomography volume mode, said mechanical positioning means is configured to rotate while emitting x-rays from the x-ray source and collecting signals from the detector assembly, and to generate said image in said computed tomography mode utilizing said collected signals.

However Watanabe fails to teach the mechanical positioning means is configured to rotate an angle of 180 degrees plus a fan angle said imaging system configurable to combine at least one image from a first mode of operation with a least one image from a second mode of operation to thereby increase image quality.

A method of rotating a source and detector about an angle of 180 degrees plus a fan angle is known in CT art.

It would have been obvious to one of ordinary skill in the art at the time of the invention to adapt the method of rotating the source and detector around 180 degrees plus a fan angle, since the rotating method would provide sufficient data collection for reconstructing tomographic image of a patient while reduce x-ray dosage for the patient's safety.

Freeman teaches a multimode imaging system to combine at least one image from the first mode of operation (CT mode) with at least one image from the second mode of operation (angiography mode) to thereby improve image quality.

It would have been obvious to one of ordinary skill in the art at the time of the invention to adapt the multi-mode method of Watanabe with the system of image combination between two imaging mode as taught by Freeman, since the system would provide more accurate images for locating patient's internal organs.

Regarding claim 5, Watanabe teaches that said plurality of modes further comprises at least one of an x-ray fluoro mode (digital radioscopic mode, column 7 line 57-58)

Regarding claim 6, Watanabe teaches that said source (6) is configured to move relative to said positioning means to alter a distance from said source to said detector (figure 3, the source 6 is movable relative to the detector).

Regarding claim 7, Watanabe teaches that said detector (8) is configured to move relative to said positioning means to alter a distance from said detector to said source (figure 3, forward/backward movement).

Regarding claim 8, Watanabe teaches that said source (6) and said detector (8) are aligned along a plane of interest, and wherein at least one of said source (6) and said detector (8) configured to move relative to other said assembly and said positioning means to alter said plane of interest (figure 3).

Regarding claim 9, Watanabe teaches that a table (table is necessitated to support a patient) for supporting the object, said source (6) and said detector (8) are movable relative said table (figure 3).

Regarding claim 10, Watanabe teaches that said positioning means (1) is movable relative to said table (figure 3).

Regarding claim 11, Watanabe teaches that said detector comprises at least one detector panel (column 5 line 49).

Regarding claim 12, Watanabe teaches that at least one said detector panel (6) is rotatable relative to said positioning means (figure 3).

Regarding claim 15, Watanabe teaches that said positioning means comprises a base and an arm movably coupled to said base (C-arm, figure 3).

Regarding claim 16, Watanabe teaches that said arm comprises a first end portion and a second end portion wherein said x-ray source assembly coupled to said arm first end portion, and wherein said detector assembly coupled to said arm second end portion (figure 3).

Regarding claim 17, Watanabe teaches that said positioning means comprises a base and a gantry rotatably coupled to said base (figure 3).

Regarding claim 18, Watanabe teaches an imaging system for generating an image of an object, said imaging system comprising a base (1), a mechanical positioning means (2) movably attached to said base (1), an x-ray source assembly (6) comprising an x-ray source (1) configured to emit x-ray signals and attached to said mechanical positioning means (2), and a detector assembly (8) comprising a detector (8) attached to said mechanical positioning means (2), said system (figure 2) configured to:

enable an operator to select a mode of operation from a plurality of modes of the imaging system (column 8 line 37-39), said plurality of modes including a computed tomography mode (column 8 line 39) in which said mechanical positioning means (2) rotates through an angle, said x-ray source emits x-rays and said detector assembly collects signals, and in which an image in said computed tomography mode is generated utilizing said collected signals (figure 9, column 4 line 4 line 10);

alter the position of said detector assembly and said source assembly relative to said other assembly and the object based on the selected mode (digital radioscopic mode, column 7 line 57-58); and

generate an image of the object.

However Watanabe fails to teach said mechanical positioning means rotates through an angle of 180 degrees plus a fan angle nor said imaging system configurable to combine at least one image from a first mode of operation with a least one image from a second mode of operation to thereby increase image quality.

A method of rotating a source and detector about an angle of 180 degrees plus a fan angle is known in CT art.

It would have been obvious to one of ordinary skill in the art at the time of the invention to adapt the method of rotating the source and detector around 180 degrees plus a fan angle, since the rotating method would provide sufficient data collection for reconstructing tomographic image of a patient while reduce x-ray dosage for the patient's safety.

Freeman teaches a multimode imaging system to combine at least one image from the first mode of operation (CT mode) with at least one image from the second mode of operation (angiography mode) to thereby improve image quality.

It would have been obvious to one of ordinary skill in the art at the time of the invention to adapt the multi-mode method of Watanabe with the system of image combination between two imaging mode as taught by Freeman, since the system would provide more accurate images for locating patient's internal organs.

Regarding claim 19, Watanabe teaches that to enable the operator to select a mode said system is configured enable the operator to select at least one of an x-ray fluoro mode (digital radioscopic mode)

Regarding claim 20, Watanabe teaches that altering the position of said detector assembly (8) and said source assembly (6), said system is configured to rotate said positioning means (2) relative to said base (1) so that said detector assembly (8) and said source assembly (6) are rotated about the object (figure 3).

Regarding claim 21, Watanabe teaches that altering the position of said detector assembly (8) and said source assembly (6), said system is configure to move at least one of said source (6) and said detector (8) relative to said other assembly to alter a distance between said source and said detector (figure 3).

Regarding claim 22, Watanabe teaches that said source (6) and said detector (8) are aligned along a plane of interest, and wherein to alter the position of said detector assembly (8) and said source assembly (6), said system is configured to move at least one of said source (6) and said detector (8) relative to said other assembly to alter the plane of interest (figure 3).

Regarding claim 23, Watanabe teaches that move at least one of said source (6) and said detector (8) relative to said other assembly, said system is configured to translate at least one of said source and said detector parallel to the plane of interest (figure 3).

Regarding claim 24, Watanabe teaches that a table (a table is necessitated to support a patient) for supporting the object, and wherein to alter the position of said detector assembly (8) and said source assembly (6), said system is configured to move said detector and said source relative to said table (figure 3).

Regarding claim 25, Watanabe teaches that move said detector assembly (8) and said source assembly (6) relative to said table (a table is necessitated to support a patient), said system is configured to rotate said detector assembly (8) and said source assembly (6) about said table (figure 3).

Regarding claim 26, Watanabe teaches that generate an image of the object, said system is configured to radiate x-ray signals from said x-ray source (6) toward said detector (8) (figure 3).

Regarding claim 27, Watanabe teaches that generate an image of the object, said system is further configured to collect image data (column 5 line 56).

Regarding claim 28, Watanabe teaches that said detector assembly (8) comprises at least one detector panel (column 5 line 48), and wherein to collect image data, said system is configured to detect x-ray signals utilizing a portion of at least one of said detector panel (column 5 line 48).

Regarding claim 29, Watanabe teaches that detect x-ray signals utilizing a portion of at least one of said detector panel (column 5 line 48, said system is configured to alter a position of at least one of said detector panel (figure 3).

Regarding claim 34, Watanabe teaches that said positioning means (2) comprises an arm having a first end portion and a second end portion, wherein said x-ray source assembly (6) coupled to said arm first end portion, and wherein said detector assembly (8) coupled to said arm second end portion (figure 3).

Regarding claim 35, Watanabe teaches that said positioning means comprises a gantry (C-arm) rotatably coupled to said base (1) (figure 3).

Claims 13-14 and 30-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe et al. as modified by Freeman further in view of Nambu et al. (US 6196715B1).

Regarding claim 13-14 and 30-31, Watanabe fails to teach that said detector comprises a first detector panel and a second detector panel and the first detector is angularly positioned relative to said second detector panel.

Nambu teaches a detector comprising a first detector panel and a second detector panel and the first detector is angularly positioned relative to said second detector panel (figure 42a).

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the radiographic system of Watanabe with the detector arrangement as taught by Nambu, since the detector arrangement of Nambu would match a resampling plane and a slice planes so that resampling process would be faster to reconstruct tomograms of a plurality of slices, independently on the shape of the detector or the movement direction (column 35 line 55-67).

Allowable Subject Matter

Claims 32-33 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claims 32-33, Nambu fails to teach the system is configured to position the first detector panel at an acute or perpendicular relative to the second detector panel.

Response to Arguments

Applicant's arguments with respect to claims 1-41 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoon Song whose telephone number is (571) 272-2494. The examiner can normally be reached on 8:30 AM - 5 PM, Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Glick can be reached on (571) 272 - 2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

HKS 3/30/08
HKS

EDWARD J. GLICK
SUPERVISORY PATENT EXAMINER